



# SPC4533W

## N & P Pair Enhancement Mode MOSFET

### DESCRIPTION

The SPC4533W is the N- and P-Channel enhancement mode power field effect transistors are produced using high cell density, DMOS trench technology. This high density process is especially tailored to minimize on-state resistance and provide superior switching performance. These devices are particularly suited for low voltage applications such as notebook computer power management and other battery powered circuits where high-side switching, low in-line power loss, and resistance to transients are needed.

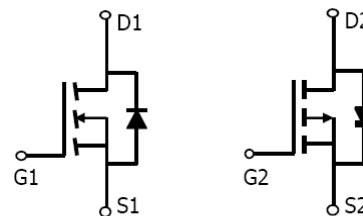
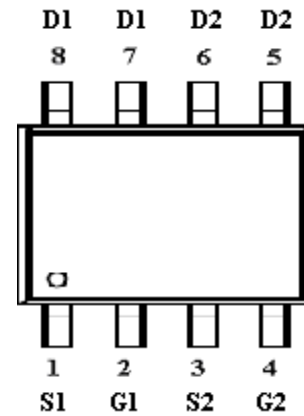
### FEATURES

- ◆ N-Channel  
30V/10A,  $R_{DS(ON)} = 25m\Omega @ V_{GS} = 10V$   
30V/8.0A,  $R_{DS(ON)} = 36m\Omega @ V_{GS} = 4.5V$
- ◆ P-Channel  
-30V/-6.0A,  $R_{DS(ON)} = 42m\Omega @ V_{GS} = -10V$   
-30V/-3.0A,  $R_{DS(ON)} = 78m\Omega @ V_{GS} = -4.5V$
- ◆ Super high density cell design for extremely low  $R_{DS(ON)}$
- ◆ Exceptional on-resistance and maximum DC current capability
- ◆ SOP – 8P package design

### APPLICATIONS

- Power Management in Note book
- Portable Equipment
- Battery Powered System
- DC/DC Converter
- Load Switch
- LCD Display inverter

### PIN CONFIGURATION(SOP – 8P)



n-channel

p-channel

### PART MARKING



A : Lot Code  
B : Date Code

### PIN DESCRIPTION



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Pin	Symbol	Description
1	S1	Source 1
2	G1	Gate 1
3	S2	Source 2
4	G2	Gate 2
5	D2	Drain 2
6	D2	Drain 2
7	D1	Drain 1
8	D1	Drain 1

### ORDERING INFORMATION

Part Number	Package	Part Marking
SPC4533WS8RGB	SOP- 8P	SPC4533W

※ SPC4533WS8RGB : 13" Tape Reel ; Pb – Free ; Halogen - Free

### ABSOLUTE MAXIMUM RATINGS

(TA=25°C Unless otherwise noted)

Parameter	Symbol	Typical		Unit
		N-Channel	P-Channel	
Drain-Source Voltage	V <sub>DSS</sub>	30	-30	V
Gate –Source Voltage	V <sub>GSS</sub>	±20	±20	V
Continuous Drain Current(T <sub>J</sub> =150°C)	I <sub>D</sub>	TA=25°C	-6.0	A
		TA=70°C	-4.0	
Pulsed Drain Current	I <sub>DM</sub>	20	-12	A
Power Dissipation	P <sub>D</sub>	2.0		W
Operating Junction Temperature	T <sub>J</sub>	-55/150		°C
Storage Temperature Range	T <sub>STG</sub>	-55/150		°C
Thermal Resistance-Junction to Ambient	R <sub>θJA</sub>	80	80	°C/W



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### N CHANNEL ELECTRICAL CHARACTERISTICS

(TA=25°C Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	30			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0		2.5	V
Gate Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 20V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=24V, V_{GS}=0V$			1	uA
		$V_{DS}=24V, V_{GS}=0V$ $T_J=55^\circ C$			5	
On-State Drain Current	$I_{D(on)}$	$V_{DS}\geq 5V, V_{GS}=10V$	25			A
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=10A$		18	25	mΩ
		$V_{GS}=4.5V, I_D=5.6A$		25	36	
Forward Transconductance	$g_{fs}$	$V_{DS}=15V, I_D=10A$		10		S
Diode Forward Voltage	$V_{SD}$	$I_S=1A, V_{GS}=0V$			1.2	V
<b>Dynamic</b>						
Total Gate Charge	$Q_g$	$V_{DS}=20V, V_{GS}=4.5V$ $I_D=10A$		7.2		nC
Gate-Source Charge	$Q_{gs}$			1.4		
Gate-Drain Charge	$Q_{gd}$			2.2		
Input Capacitance	$C_{iss}$	$V_{DS}=15V, V_{GS}=0V$ $f=1MHz$		570		pF
Output Capacitance	$C_{oss}$			81		
Reverse Transfer Capacitance	$C_{rss}$			65		
Turn-On Time	$t_{d(on)}$	$V_{DD}=12V, I_D=5.0A,$ $V_{GEN}=10V, R_G=3.3\Omega$		4.1		nS
	$t_r$			9.8		
Turn-Off Time	$t_{d(off)}$			15.5		
	$t_f$			6.1		



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### P CHANNEL ELECTRICAL CHARACTERISTICS

(TA=25°C Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-30			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.0		-2.5	
Gate Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 20V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-24V, V_{GS}=0V$			-1	uA
		$V_{DS}=-24V, V_{GS}=0V$ $T_J=55^\circ C$			-5	
On-State Drain Current	$I_{D(on)}$	$V_{DS} \leq -5V, V_{GS}=-10V$	-6			A
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-6A$		0.035	0.042	$\Omega$
		$V_{GS}=-4.5V, I_D=-3A$		0.065	0.078	
Forward Transconductance	$g_{fs}$	$V_{DS}=-10.0V, I_D=-6A$		6		S
Diode Forward Voltage	$V_{SD}$	$I_S=-6A, V_{GS}=0V$			-1.2	V
<b>Dynamic</b>						
Total Gate Charge	$Q_g$	$V_{DS}=-20V, V_{GS}=-4.5V$ $I_D=-6A$		6.4		nC
Gate-Source Charge	$Q_{gs}$			2.7		
Gate-Drain Charge	$Q_{gd}$			3.1		
Input Capacitance	$C_{iss}$	$V_{DS}=-24V, V_{GS}=0V$ $f=1MHz$		650		pF
Output Capacitance	$C_{oss}$			270		
Reverse Transfer Capacitance	$C_{rss}$			104		
Turn-On Time	$t_{d(on)}$	$V_{DD}=-12V, I_D=-5.0A,$ $V_{GEN}=-10V$ $R_G=3.3\Omega$		9		ns
	$t_r$			16		
Turn-Off Time	$t_{d(off)}$			21		
	$t_f$			22		



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### N CHANNEL TYPICAL CHARACTERISTICS

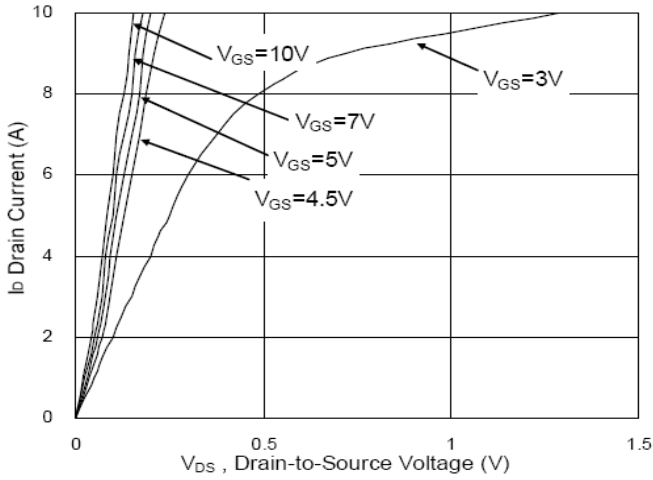


Fig. 1 Typical Output Characteristics

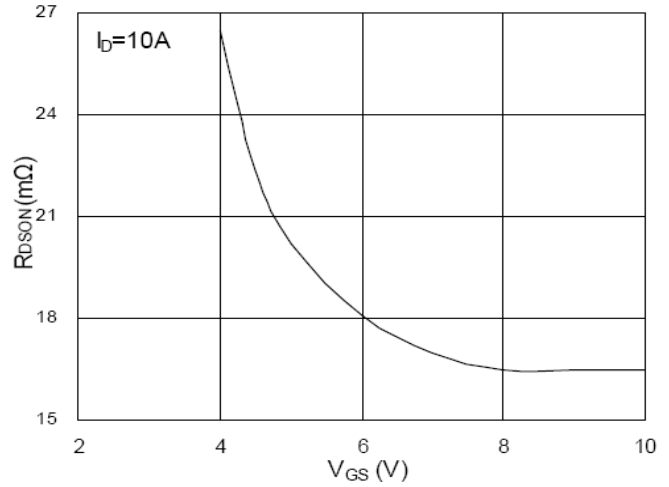


Fig. 2 On-Resistance vs. Gate Voltage

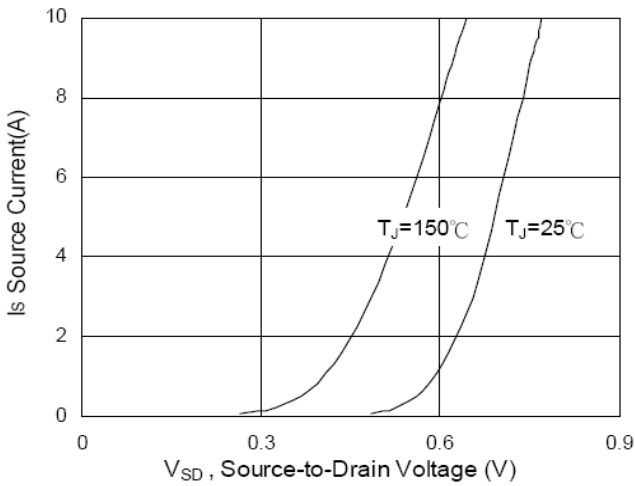


Fig. 3 Forward Characteristics of Diode

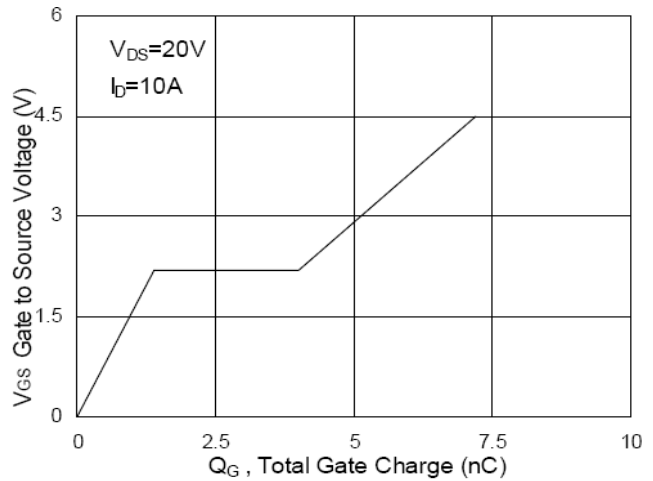


Fig. 4 Gate Charge Characteristics

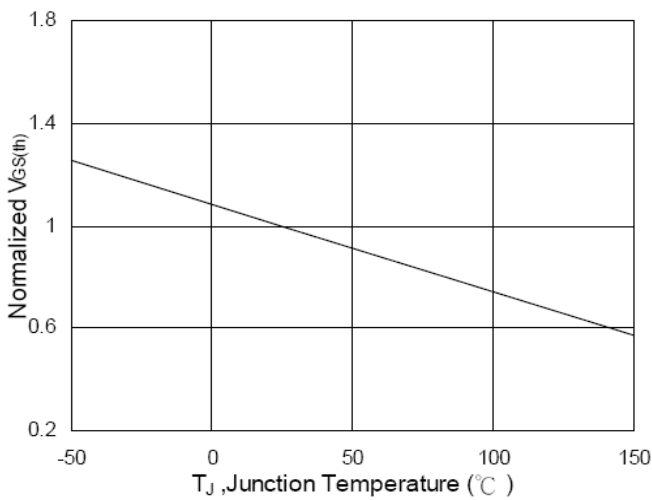


Fig. 5  $V_{GS}$  vs. Junction Temperature

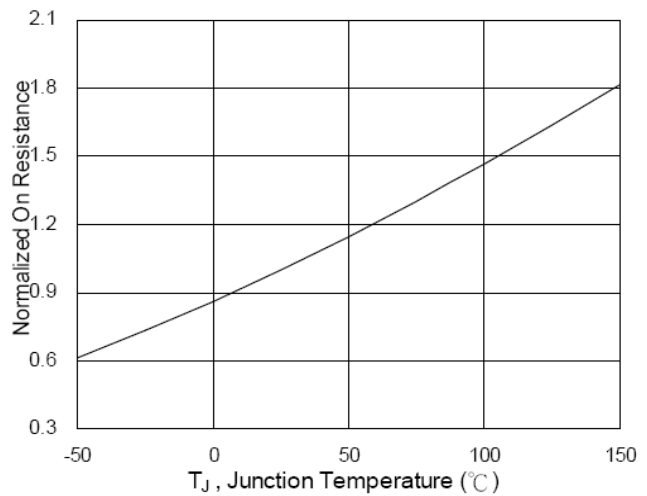


Fig. 6 On-Resistance vs. Junction Temperature



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## N CHANNEL TYPICAL CHARACTERISTICS

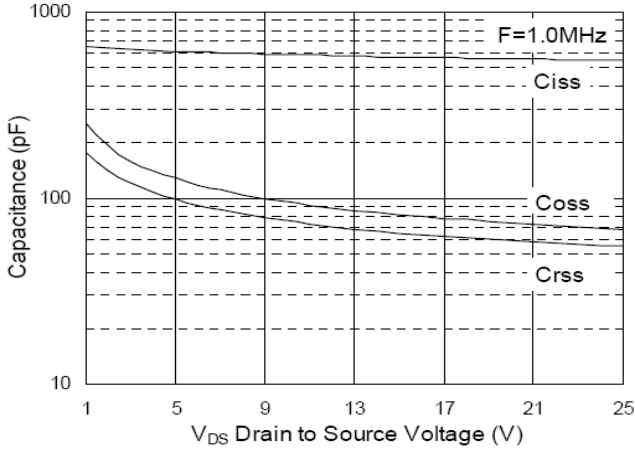


Fig. 7 Typical Capacitance Characteristics

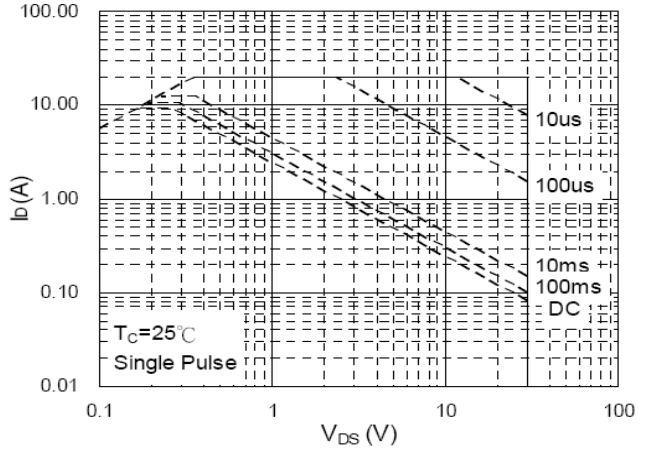


Fig. 8 Maximum Safe Operation Area

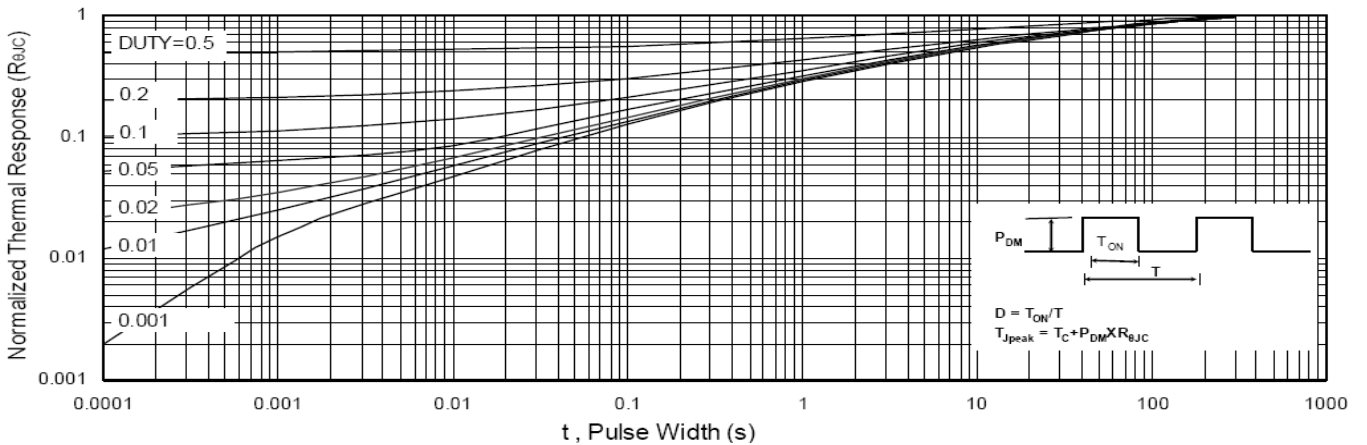


Fig. 9 Effective Transient Thermal Impedence

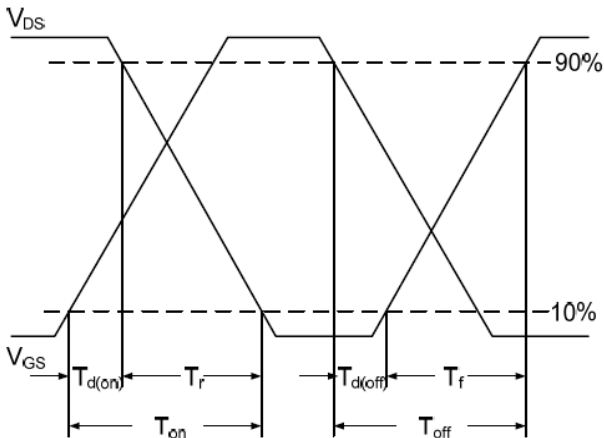


Fig. 10 Switching Time Waveform

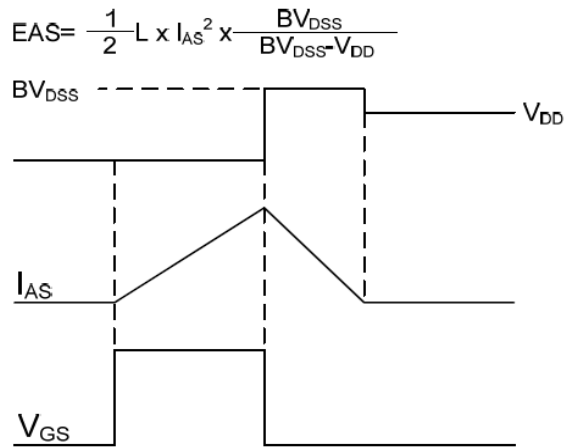


Fig. 11 Unclamped Inductive Waveform



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## N & P Pair Enhancement Mode MOSFET

### P CHAEENL TYPICAL CHARACTERISTICS

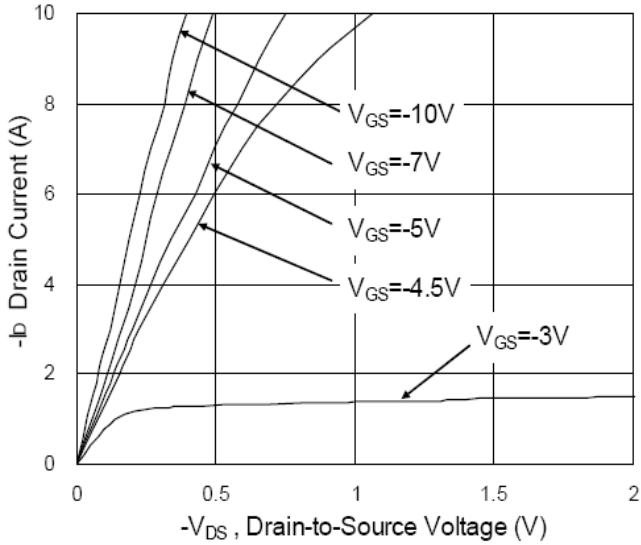


Fig. 1 Typical Output Characteristics

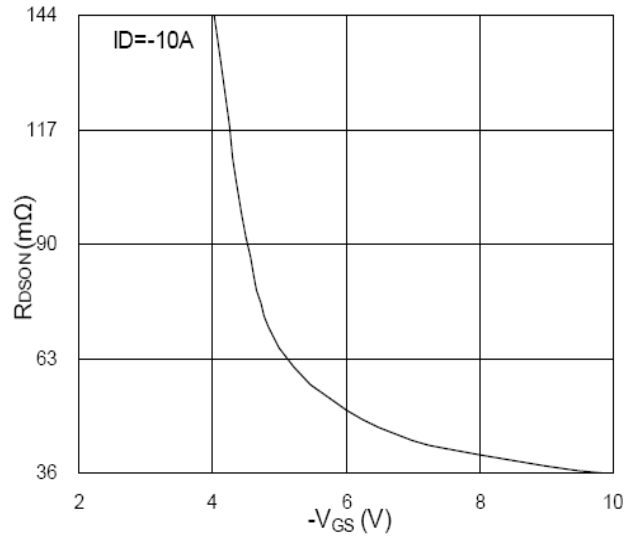


Fig. 2 On-Resistance vs. Gate Voltage

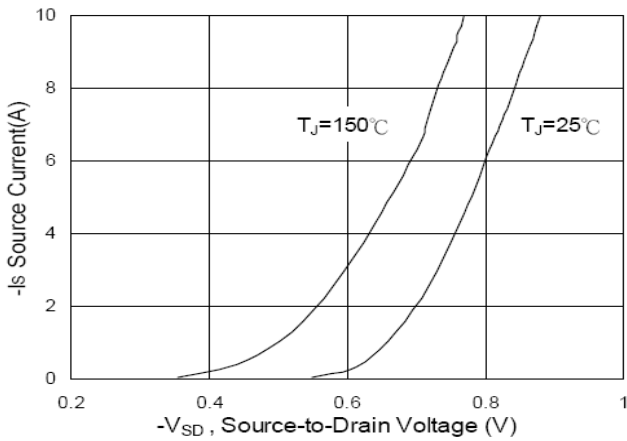


Fig. 3 Forward characteristics of Diodes

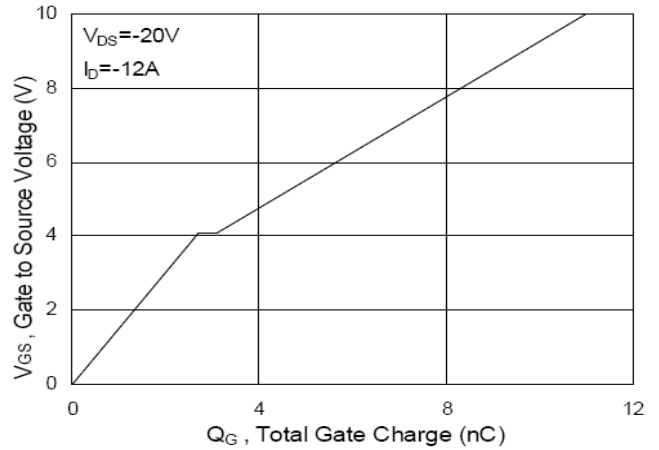


Fig. 4 Gate Charge Characteristics

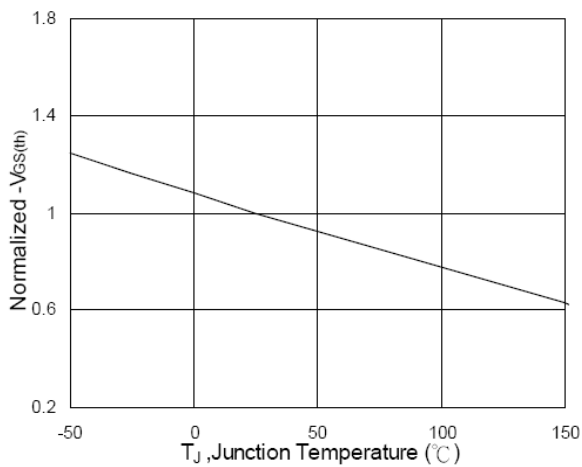


Fig. 5  $V_{GS}$  vs. Junction Temperature

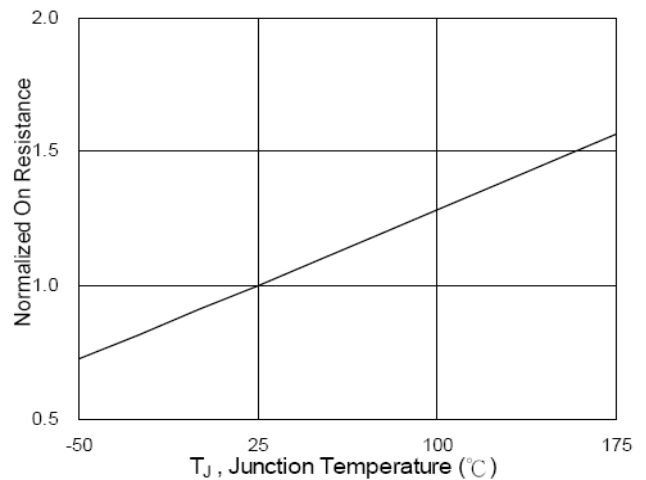


Fig. 6 On-Resistance vs Junction Temp



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## P CHANNEL TYPICAL CHARACTERISTICS

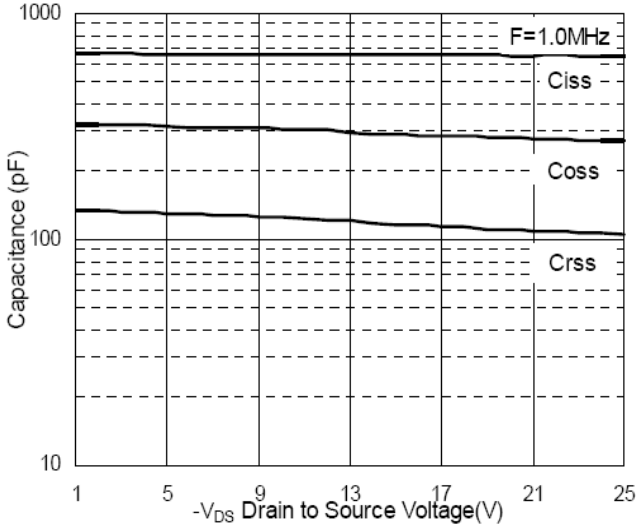


Fig. 7 Typical Capacitance Characteristics

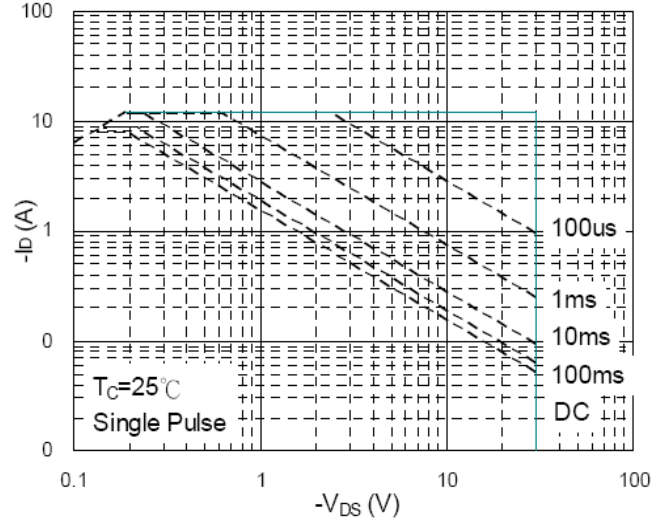


Fig. 8 Maximum Safe Operation Area

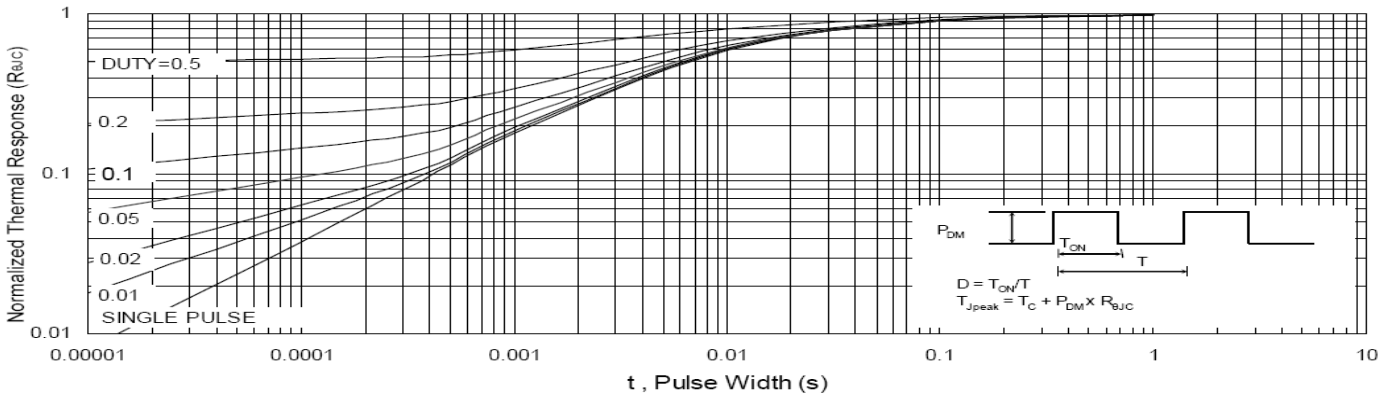


Fig. 9 Effective Transient Thermal Impedance

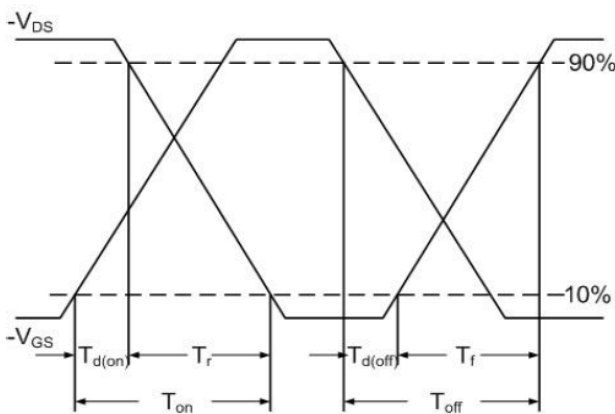


Fig. 10 Switching Time Waveform

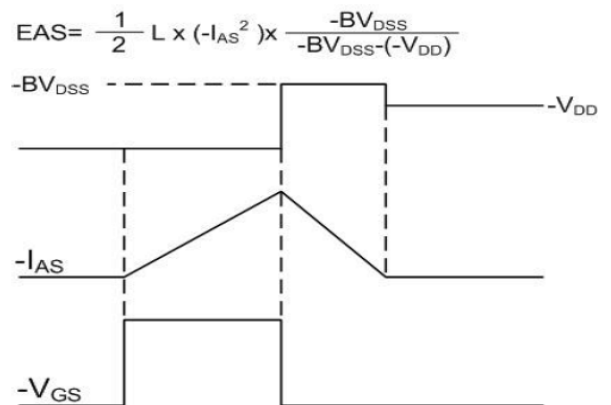


Fig. 11 Unclamped Inductive Waveform

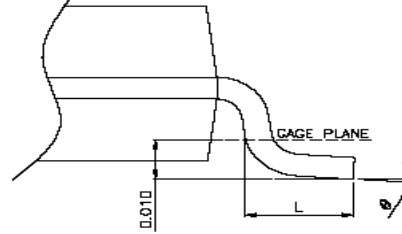
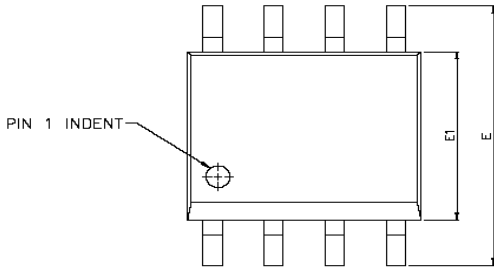




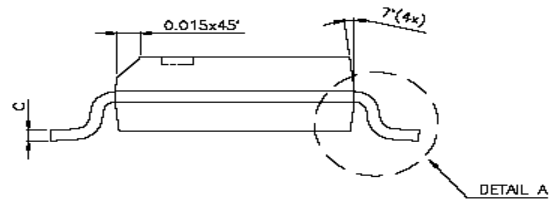
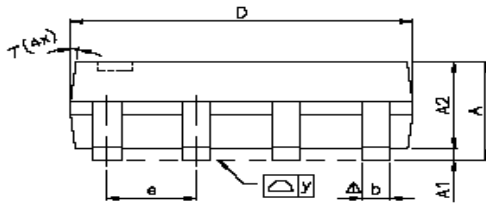
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### SOP- 8 PACKAGE OUTLINE



DETAIL A



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.47	1.60	1.73	0.058	0.063	0.068
A1	0.10	—	0.25	0.004	—	0.010
A2	—	1.45	—	—	0.057	—
b	0.33	0.41	0.51	0.013	0.016	0.020
C	0.19	0.20	0.25	0.0075	0.008	0.0098
D	4.80	4.85	4.95	0.189	0.191	0.195
E	5.80	6.00	6.20	0.228	0.236	0.244
E1	3.80	3.90	4.00	0.150	0.154	0.157
e	—	1.27	—	—	0.050	—
L	0.38	0.71	1.27	0.015	0.028	0.050
$\Delta$ y	—	—	0.076	—	—	0.003
$\theta$	0°	—	8°	0°	—	8°



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