

**P-Channel Enhancement Mode Power MOSFET**

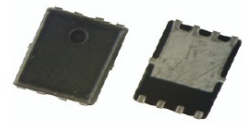
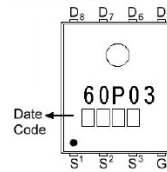
PRIMARY CHARACTERISTICS	
$BV_{DSS}$	-30V
$R_{DS(ON)}$	8.5m $\Omega$
$I_D$	-60A
$T_{J,Max}$	150 $^{\circ}$ C

**FEATURES**

- Advanced DMOS Trench technology
- Suit for -4.5V Gate Drive Application
- Green Device Available
- Fast switching
- 100% EAS Guaranteed

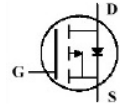
**PR-PAK PACKAGE**

Marking :



Date Code

424236, 574237  
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 A B C D E F G H I J K L M  
 1 2 3 4 5 6 7 8 X 9 10 11 12  
 Vj g'y kf'eqf g'°Rqf wekp V[r g'Pq0'01-99  
 Vj g'kpwj'eqf g'°Rqf wekp V[r g'Pq0'01-99  
 Cc°:4A01=2014101'Rqf weg


**MECHANICAL DATA**

- Case : Molded plastic,PR-PAK
- Polarity : Shown above
- Terminals :Plated terminals, solderable per MIL-STD-750,Method 2026
- Epoxy : UL94-V0 rated flame retardant

**DESCRIPTION**

- The SPR60P03 is using trench DMOS technology. This advanced technology has been especially tailored to minimize RDS(ON), provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.
- The SPR60P03 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

**Absolute Maximum Ratings**

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	$V_{DS}$	-30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current <sup>1</sup>	$I_D @T_C=25^{\circ}C$	-60	A
Continuous Drain Current <sup>1</sup>	$I_D @T_C=100^{\circ}C$	-38	A
Pulsed Drain Current <sup>1,2</sup>	$I_{DM}$	-240	A
Total Power Dissipation <sup>4</sup>	$P_D @T_C=25^{\circ}C$	96	W
	$P_D @T_A=25^{\circ}C$	2	W
Single Pulse Avalanche Energy, L=0.1mH <sup>3</sup>	$E_{AS}$	168	mJ
Single Pulse Avalanche Current, L=0.1mH <sup>3</sup>	$I_{AS}$	-58	A
Operating Junction and Storage Temperature Range	$T_j, T_{stg}$	-55 ~ +150	$^{\circ}C$

**Thermal Data**

Parameter	Symbol	Conditions	Max. Value	Unit
Thermal Resistance Junction-ambient <sup>1</sup>	$R_{\theta JA}$	Steady State	62.5	$^{\circ}C/W$
Thermal Resistance Junction-case <sup>1</sup>	$R_{\theta JC}$	Steady State	1.3	$^{\circ}C/W$

**Electrical Characteristics (T<sub>j</sub> = 25°C unless otherwise specified)**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-30	-	-	V	V <sub>GS</sub> =0, I <sub>D</sub> =-250uA
Gate Threshold Voltage	V <sub>GS(th)</sub>	-1.2	-1.6	-2.5	V	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250uA
Forward Transconductance	g <sub>fs</sub>	-	14	-	S	V <sub>DS</sub> =-10V, I <sub>D</sub> =-10A
Gate-Source Leakage Current	I <sub>GSS</sub>	-	-	±100	nA	V <sub>GS</sub> = ±20V
Drain-Source Leakage Current(T <sub>j</sub> =25°C)	I <sub>DSS</sub>	-	-	-1	uA	V <sub>DS</sub> =-30V, V <sub>GS</sub> =0
Drain-Source Leakage Current(T <sub>j</sub> =125°C)		-	-	-10	uA	V <sub>DS</sub> =-24V, V <sub>GS</sub> =0
Static Drain-Source On-Resistance <sup>2</sup>	R <sub>DS(ON)</sub>	-	7.2	8.5	mΩ	V <sub>GS</sub> =-10V, I <sub>D</sub> =-20A
		-	11.5	14		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-16A
Total Gate Charge <sup>2</sup>	Q <sub>g</sub>	-	35	-	nC	I <sub>D</sub> =-10A V <sub>DS</sub> =-15V V <sub>GS</sub> =-4.5V
Gate-Source Charge	Q <sub>gs</sub>	-	10.8	-		
Gate-Drain ("Miller") Change	Q <sub>gd</sub>	-	10.6	-		
Turn-on Delay Time <sup>2</sup>	T <sub>d(on)</sub>	-	24.5	-	ns	V <sub>DD</sub> =-15V I <sub>D</sub> =-1A V <sub>GS</sub> =-10V R <sub>G</sub> =6Ω
Rise Time	T <sub>r</sub>	-	10.5	-		
Turn-off Delay Time	T <sub>d(off)</sub>	-	157	-		
Fall Time	T <sub>f</sub>	-	50	-		
Input Capacitance	C <sub>iss</sub>	-	3300	-	pF	V <sub>GS</sub> =0V V <sub>DS</sub> =-15V f=1.0MHz
Output Capacitance	C <sub>oss</sub>	-	410	-		
Reverse Transfer Capacitance	C <sub>rss</sub>	-	280	-		

**Guaranteed Avalanche Characteristics**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Single Pulse Avalanche Energy <sup>5</sup>	EAS	20	-	-	mJ	V <sub>DD</sub> =-25V, L=0.1mH, I <sub>AS</sub> =-20A

**Source-Drain Diode**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Forward On Voltage <sup>2</sup>	V <sub>SD</sub>	-	-	-1.2	V	V <sub>GS</sub> =0V, I <sub>S</sub> =-20A, T <sub>J</sub> =25°C
Continuous Source Current <sup>1,6</sup>	I <sub>S</sub>	-	-	-60	A	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current
Pulsed Source Current <sup>2,6</sup>	I <sub>SM</sub>	-	-	-120	A	

Notes: 1. The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.

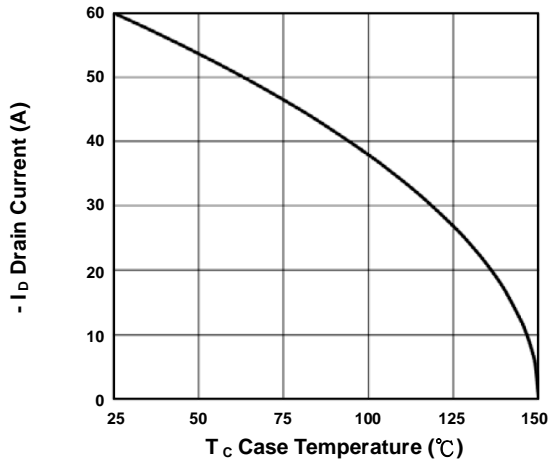
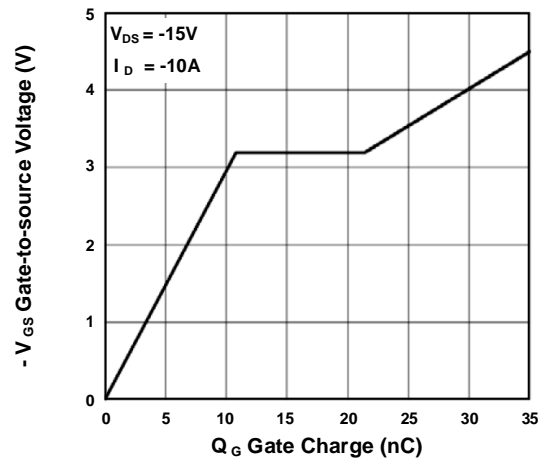
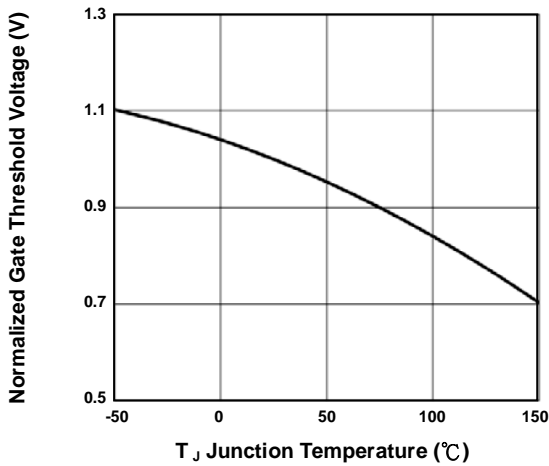
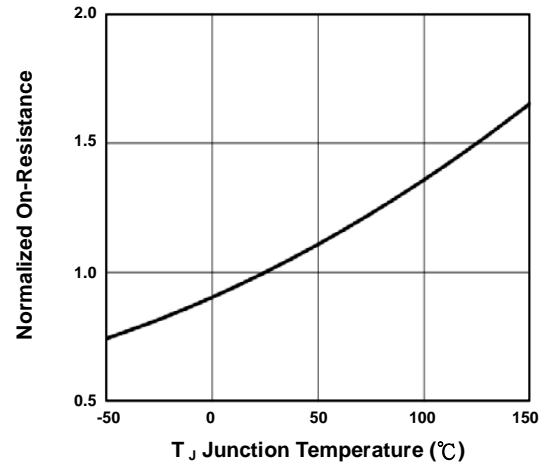
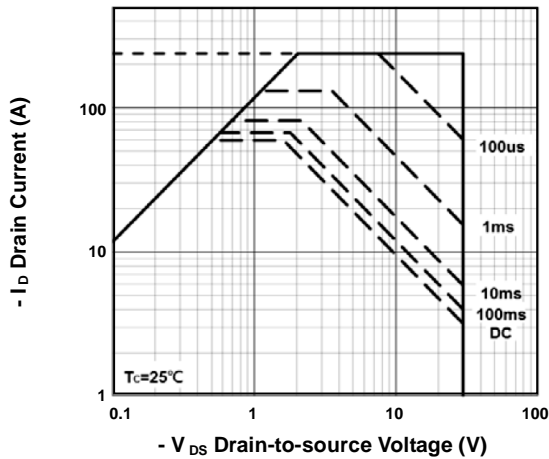
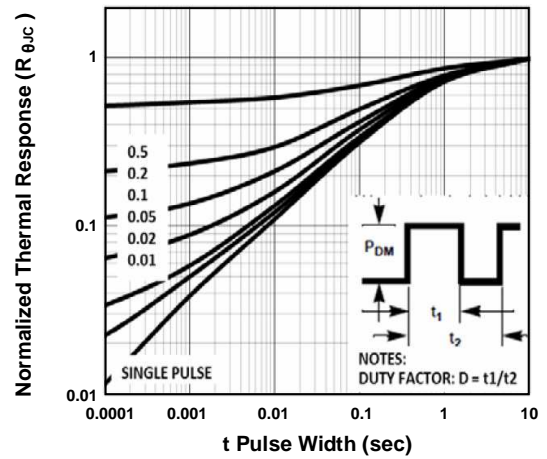
2. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.

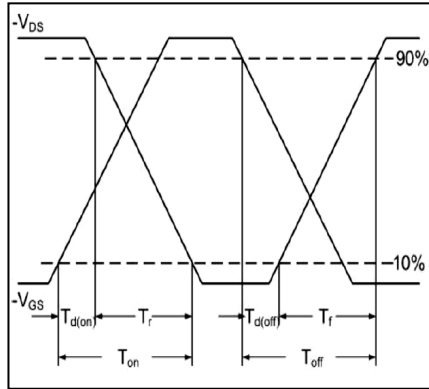
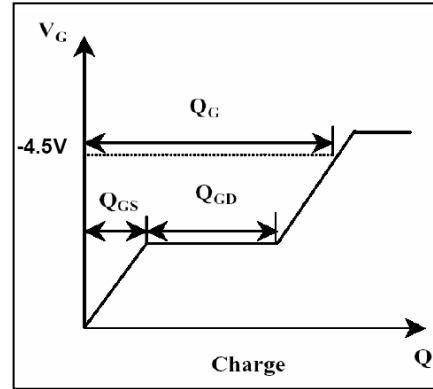
3. The EAS data shows Max. rating. The test condition is V<sub>DD</sub>=-25V, V<sub>GS</sub>=-10V, L=0.1mH, I<sub>AS</sub>=-58A.

4. The power dissipation is limited by 150°C junction temperature.

5. The Min. value is 100% EAS tested guarantee.

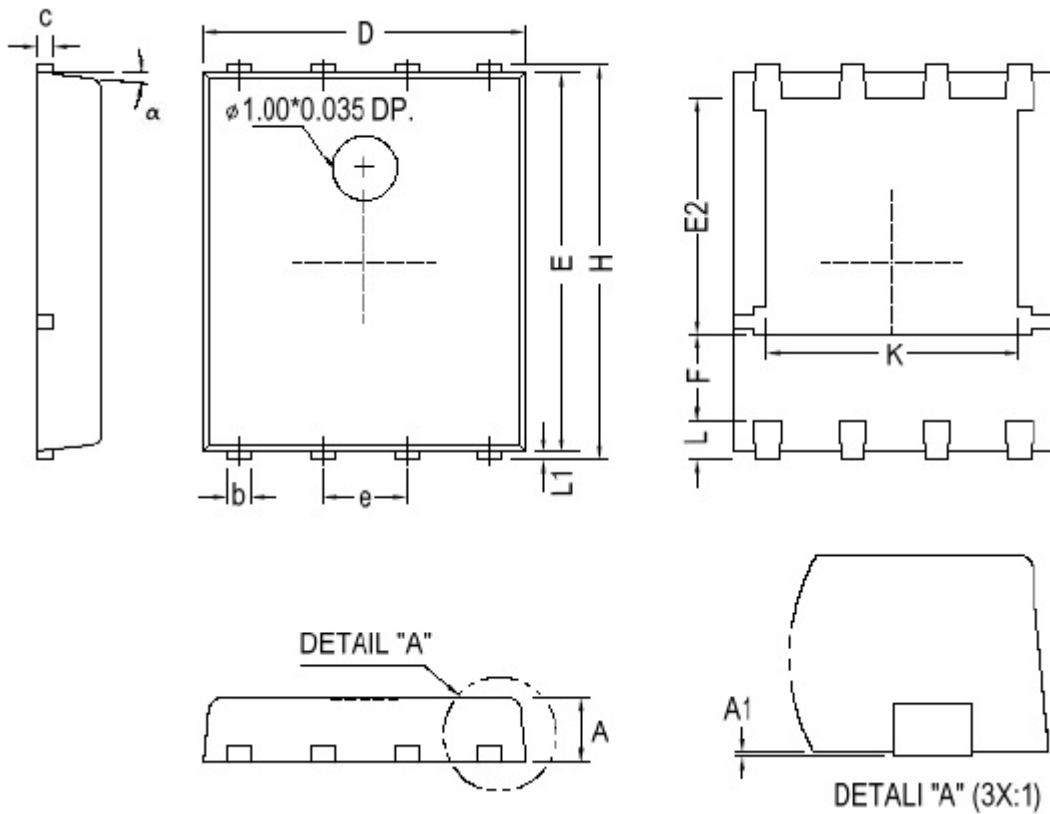
6. The data is theoretically the same as I<sub>D</sub> and I<sub>DM</sub>, in real applications, should be limited by total power dissipation.

**Electrical Characteristics**

**Fig.1 Drain Current vs.  $T_c$** 

**Fig.2 Gate Charge Characteristics**

**Fig.3 Normalized  $V_{GS(th)}$  vs.  $T_j$** 

**Fig.4 Normalized  $R_{DS(on)}$  vs.  $T_j$** 

**Fig.5 Safe Operating Area**

**Fig.6 Transient Thermal Impedance**


**Fig.7 Switching Time Waveform**

**Fig.8 Gate Charge Waveform**

# Outline Drawing

# PR-PAK



REF.	Millimeter			REF.	Millimeter		
	Min.	Nom.	Max.		Min.	Nom.	Max.
A	0.85	1.00	1.15	E	5.70	-	5.90
A1	0.00	-	0.10	e	-	1.27	-
b	0.30	-	0.51	H	5.90	-	6.20
c	0.20	-	0.30	L	-	0.60	-
D	4.80	-	5.00	L1	0.06	-	0.20
F	1.10REF.			alpha	0°	-	12°
E2	3.50REF.			K	3.70	3.90	4.10

**Rev.C**

**Ordering Information:**

Device PN	Packing
SPR60P03-T <sup>(1)</sup> H <sup>(2)</sup> -WS	Tape&Reel: 3 Kpcs/Reel

Note: (1) Packing code, Tape & Reel Packing

(2) Haloge free product for packing code suffix "H"

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