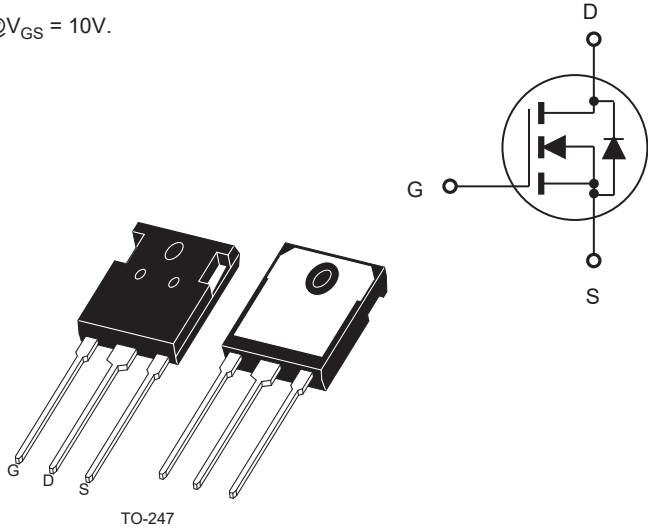


## N-Channel Super Junction Power MOSFET With Fast Body Diode

### FEATURES

- 650V@ $T_{J,max}$ , 100A,  $R_{DS(ON)} = 26m\Omega$  @ $V_{GS} = 10V$ .
- Excellent  $R_{DS(ON)}$  and Low Gate Charge.
- Pb-free lead plating ; RoHS compliant.
- Halogen Free.
- Fast reverse recovery time.
- TO-247 package.



### ABSOLUTE MAXIMUM RATINGS $T_C = 25^\circ C$ unless otherwise noted

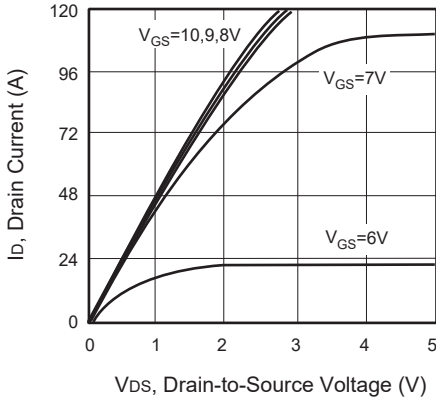
Parameter	Symbol	Limit	Units
Drain-Source Voltage	$V_{DS}$	600	V
Gate-Source Voltage	$V_{GS}$	$\pm 30$	V
Drain Current-Continuous @ $T_C = 25^\circ C$ @ $T_C = 100^\circ C$	$I_D$	100	A
		63	A
Drain Current-Pulsed <sup>a</sup>	$I_{DM}$	400	A
Maximum Power Dissipation @ $T_C = 25^\circ C$ - Derate above $25^\circ C$	$P_D$	658	W
		5.26	W/ $^\circ C$
Single Pulsed Avalanche Energy <sup>d</sup>	$E_{AS}$	2205	mJ
Single Pulsed Avalanche Current <sup>d</sup>	$I_{AS}$	21	A
Operating and Store Temperature Range	$T_J, T_{stg}$	-55 to 150	$^\circ C$

### Thermal Characteristics

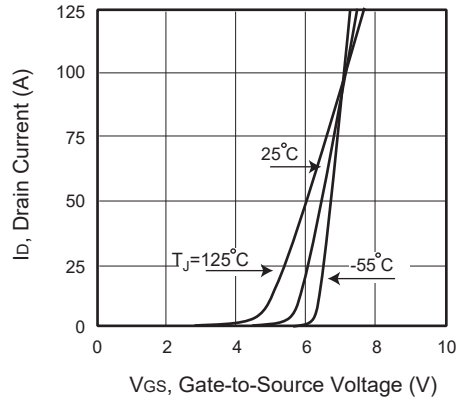
Parameter	Symbol	Limit	Units
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.19	$^\circ C/W$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	$^\circ C/W$

## Electrical Characteristics $T_C = 25^\circ\text{C}$ unless otherwise noted

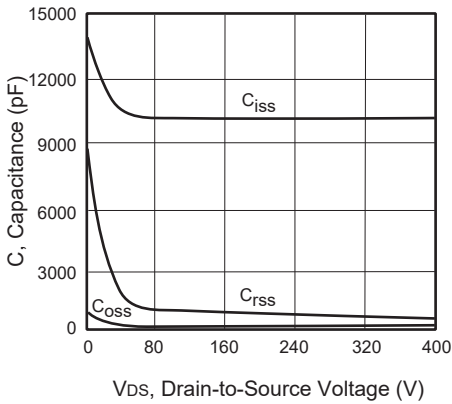
Parameter	Symbol	Test Condition	Min	Typ	Max	Units	
<b>Off Characteristics</b>							
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS} = 0V, I_D = 1mA$	600			V	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 600V, V_{GS} = 0V$			10	$\mu A$	
Gate Body Leakage Current, Forward	$I_{GSSF}$	$V_{GS} = 30V, V_{DS} = 0V$			100	nA	
Gate Body Leakage Current, Reverse	$I_{GSSR}$	$V_{GS} = -30V, V_{DS} = 0V$			-100	nA	
<b>On Characteristics<sup>b</sup></b>							
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS} = V_{DS}, I_D = 2mA$	3		4.5	V	
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 20A$		20	26	m $\Omega$	
<b>Dynamic Characteristics<sup>c</sup></b>							
Input Capacitance	$C_{iss}$	$V_{DS} = 400V, V_{GS} = 0V,$ $f = 1MHz$		9965		pF	
Output Capacitance	$C_{oss}$			190		pF	
Reverse Transfer Capacitance	$C_{rss}$			10		pF	
<b>Switching Characteristics<sup>c</sup></b>							
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 400V, I_D = 16A,$ $V_{GS} = 10V, R_{GEN} = 5.3\Omega$		75		ns	
Turn-On Rise Time	$t_r$			16		ns	
Turn-Off Delay Time	$t_{d(off)}$			181		ns	
Turn-Off Fall Time	$t_f$			11		ns	
Total Gate Charge	$Q_g$				190		nC
Gate-Source Charge	$Q_{gs}$	$V_{DS} = 400V, I_D = 16A,$ $V_{GS} = 10V$			49	nC	
Gate-Drain Charge	$Q_{gd}$				76	nC	
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>							
Drain-Source Diode Forward Current	$I_S$				100	A	
Drain-Source Diode Forward Voltage <sup>b</sup>	$V_{SD}$	$V_{GS} = 0V, I_S = 20A$			1.4	V	
Reverse Recovery Time	$T_{rr}$	$I_F = 7.5A, di/dt = 100A/\mu s$		260		ns	
Reverse Recovery Charge	$Q_{rr}$				2.75		$\mu C$
Peak Reverse Recovery Current	$I_{rr}$				18		A
<b>Notes :</b> a.Repetitive Rating : Pulse width limited by maximum junction temperature. b.Pulse Test : Pulse Width $\leq 300\mu s$ , Duty Cycle $\leq 2\%$ . c.Guaranteed by design, not subject to production testing. d.L = 10mH, $I_{AS} = 21A$ , $V_{DD} = 100V$ , $R_G = 25\Omega$ , Starting $T_J = 25^\circ C$ .							



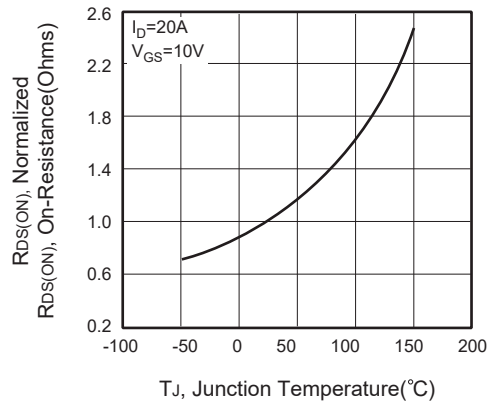
**Figure 1. Output Characteristics**



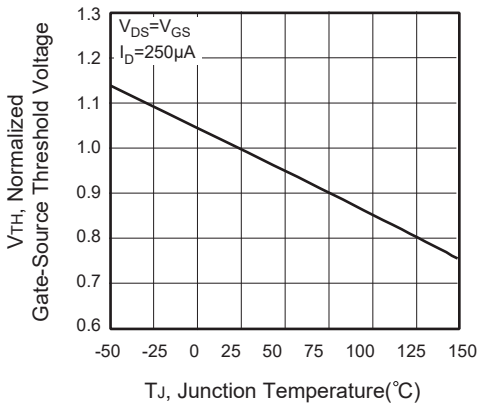
**Figure 2. Transfer Characteristics**



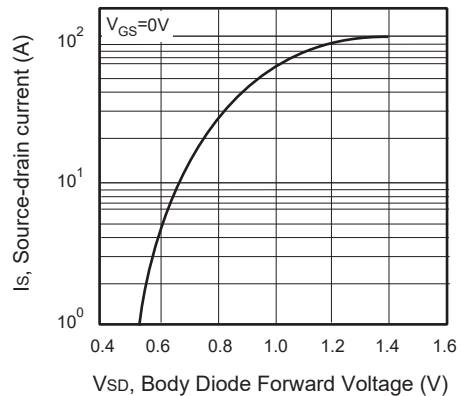
**Figure 3. Capacitance**



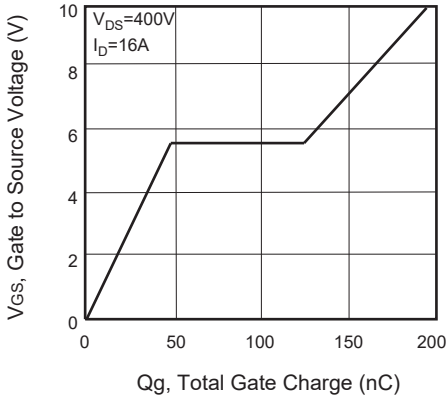
**Figure 4. On-Resistance Variation with Temperature**



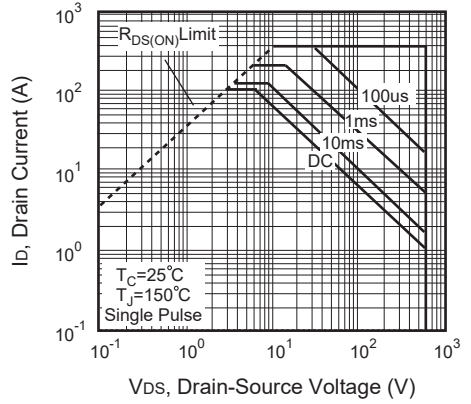
**Figure 5. Gate Threshold Variation with Temperature**



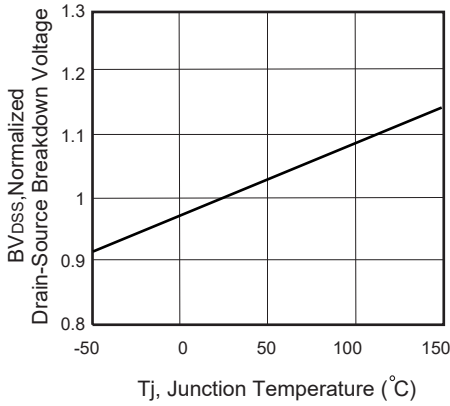
**Figure 6. Body Diode Forward Voltage Variation with Source Current**



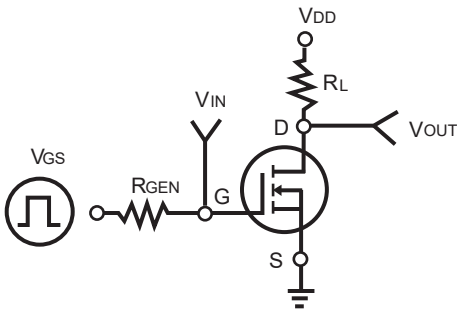
**Figure 7. Gate Charge**



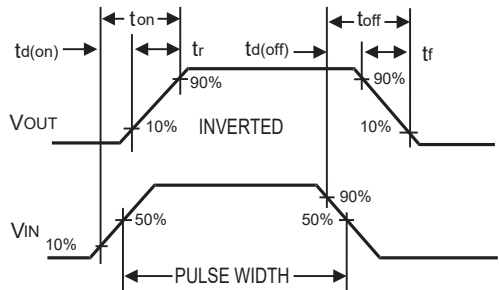
**Figure 8. Maximum Safe Operating Area**



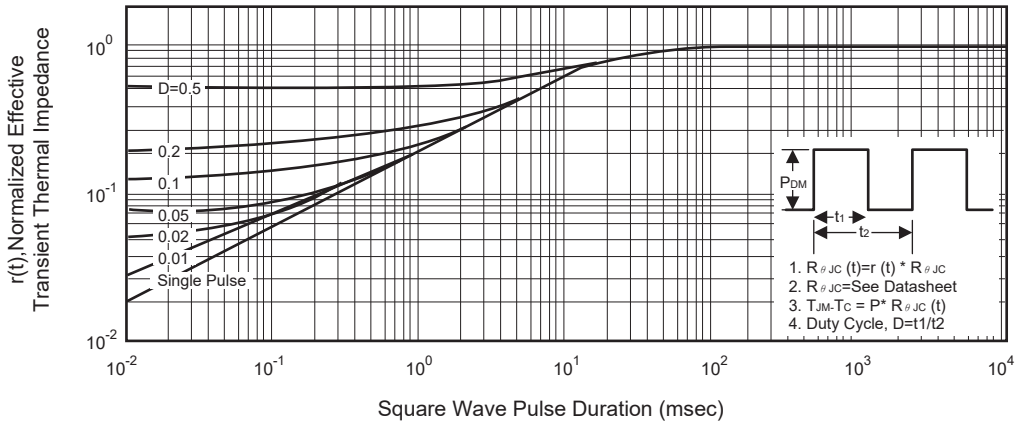
**Figure 9. Breakdown Voltage Variation VS Temperature**



**Figure 10. Switching Test Circuit**

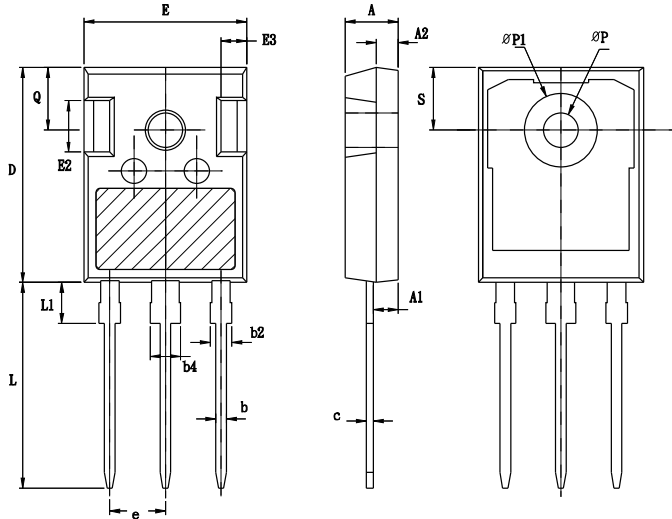


**Figure 11. Switching Waveforms**



**Figure 12. Normalized Thermal Transient Impedance Curve**

## TO-247 產品外觀尺寸圖 (Product Outline Dimension)



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.830	5.210	0.190	0.205
A1	2.310	2.510	0.091	0.099
A2	1.900	2.160	0.075	0.085
b	1.140	1.400	0.045	0.055
b2	1.910	2.200	0.075	0.087
b4	2.960	3.160	0.117	0.124
C	0.550	0.750	0.022	0.030
D	20.800	21.340	0.819	0.840
e	5.45BSC		0.215BSC	
E	15.700	16.130	0.618	0.635
E2	4.320	5.100	0.170	0.201
E3	1.58	2.60	0.062	0.102
L	19.80	20.57	0.780	0.810
L1	3.81	4.32	0.150	0.170
ΦP	3.5	3.7	0.138	0.146
ΦP1	~	7.3	~	0.287
S	6.15BSC		0.242BSC	
Q	5.59	6.2	0.220	0.244