

N-Channel Power MOSFET

FEATURES

- Super-Junction technology
- High performance good FOM
- High ruggedness performance
- High commutation performance
- 100% UIS & Rg tested
- RoHS Compliant
- Halogen-free

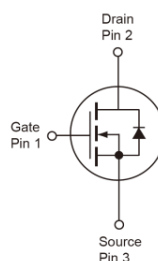
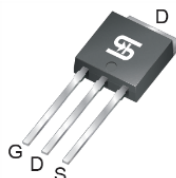
APPLICATIONS

- Power Supply
- Lighting

KEY PERFORMANCE PARAMETERS		
PARAMETER	VALUE	UNIT
$V_{DS} @ T_{j,max}$	650	V
$R_{DS(on)}$ (max)	1.5	Ω
$Q_{g,typ}$	7.6	nC



TO-251 (IPAK)



ABSOLUTE MAXIMUM RATINGS (T _A = 25°C unless otherwise noted)				
PARAMETER		SYMBOL	LIMIT	UNIT
Drain-Source Voltage		V _{DS}	600	V
Gate-Source Voltage		V _{GS}	±20	V
Continuous Drain Current ^(Note 1)	T _C = 25°C	I _D	3	A
	T _C = 100°C		2	A
Pulsed Drain Current ^(Note 2)		I _{DM}	9	A
Total Power Dissipation @ T _C = 25°C		P _D	39	W
Single Pulse Avalanche Energy ^(Note 3)		E _{AS}	100	mJ
Single Pulse Avalanche Current ^(Note 3)		I _{AS}	2	A
Operating Junction and Storage Temperature Range		T _J , T _{STG}	- 55 to +150	°C

THERMAL PERFORMANCE			
PARAMETER	SYMBOL	LIMIT	UNIT
Junction to Case Thermal Resistance	$R_{\theta JC}$	3.2	$^\circ\text{C/W}$
Junction to Ambient Thermal Resistance	$R_{\theta JA}$	45	$^\circ\text{C/W}$

Thermal Performance Note: $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistances. The case-thermal reference is defined at the solder mounting surface of the drain pins. $R_{\theta JA}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design.

ELECTRICAL SPECIFICATIONS (T _A = 25°C unless otherwise noted)						
PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNIT
Static (Note 4)						
Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 1mA	BV _{DSS}	600	--	--	V
Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 1mA	V _{GS(TH)}	3	4.3	5	V
Gate Body Leakage	V _{GS} = ± 20V, V _{DS} = 0V	I _{GSS}	--	--	±100	nA
Zero Gate Voltage Drain Current	V _{DS} = 600V, V _{GS} = 0V	I _{DSS}	--	--	100	μA
Drain-Source On-State Resistance	V _{GS} = 10V, I _D = 1A	R _{DS(on)}	--	1.3	1.5	Ω
Dynamic (Note 5)						
Total Gate Charge	V _{DS} = 300V, I _D = 3A, V _{GS} = 10V	Q _g	--	7.6	--	nC
Gate-Source Charge		Q _{gs}	--	2.6	--	
Gate-Drain Charge		Q _{gd}	--	4	--	
Input Capacitance	V _{DS} = 300V, V _{GS} = 0V, f = 1.0MHz	C _{iss}	--	235	--	pF
Output Capacitance		C _{oss}	--	16	--	
Reverse Transfer Capacitance		C _{rss}	--	10	--	
Gate Resistance	f = 1.0MHz	R _g	1.05	3.5	7	Ω
Switching (Note 6)						
Turn-On Delay Time	V _{DD} = 300V, R _G = 10Ω, I _D = 1.5A, V _{GS} = 10V	t _{d(on)}	--	18	--	ns
Turn-On Rise Time		t _r	--	18	--	
Turn-Off Delay Time		t _{d(off)}	--	34	--	
Turn-Off Fall Time		t _f	--	41	--	
Source-Drain Diode (Note 4)						
Body-Diode Continuous Forward Current		I _S	--	--	3	A
Body-Diode Pulsed Current		I _{SM}	--	--	9	A
Forward Voltage	I _S = 3A, V _{GS} = 0V	V _{SD}	--	--	1.5	V
Reverse Recovery Time	V _{DD} = 480V, I _S = 3A dI _F /dt = 100A/μs	t _{rr}	--	206	--	ns
Reverse Recovery Charge		Q _{rr}	--	1.5	--	μC

Notes:

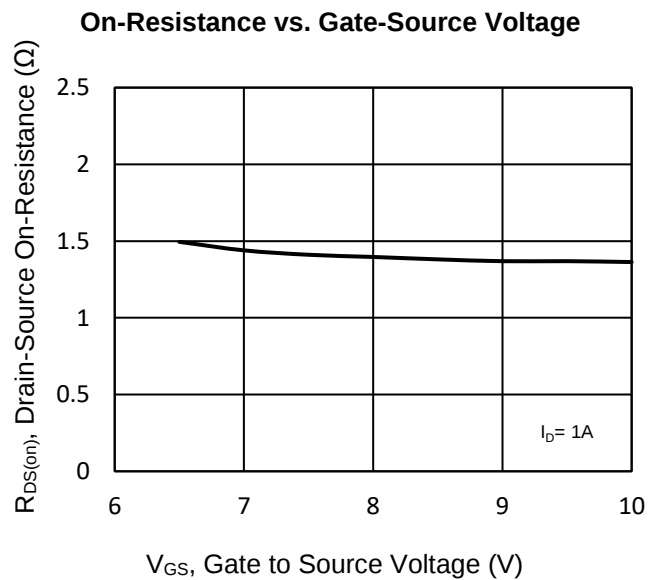
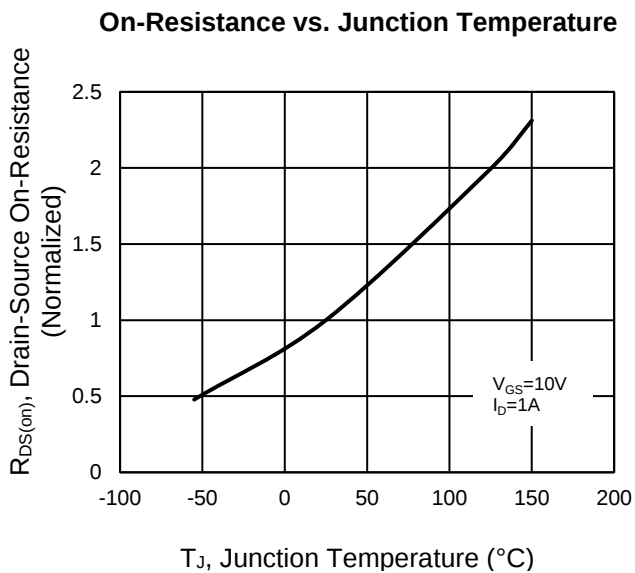
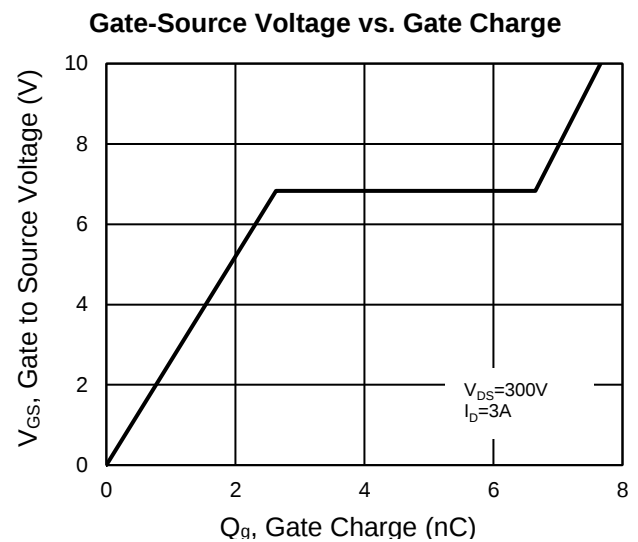
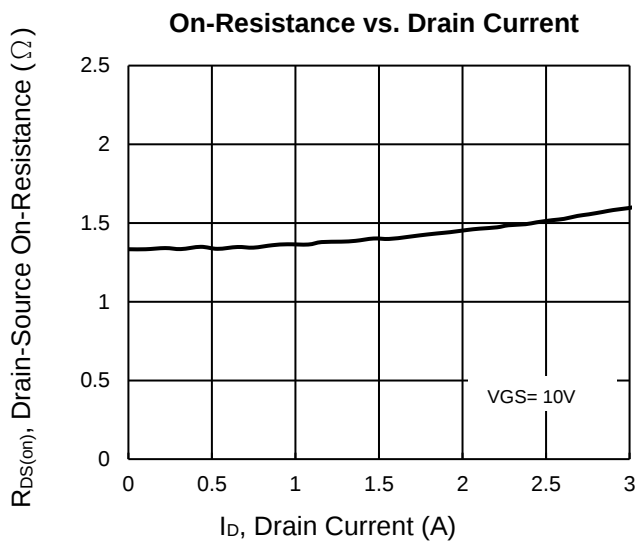
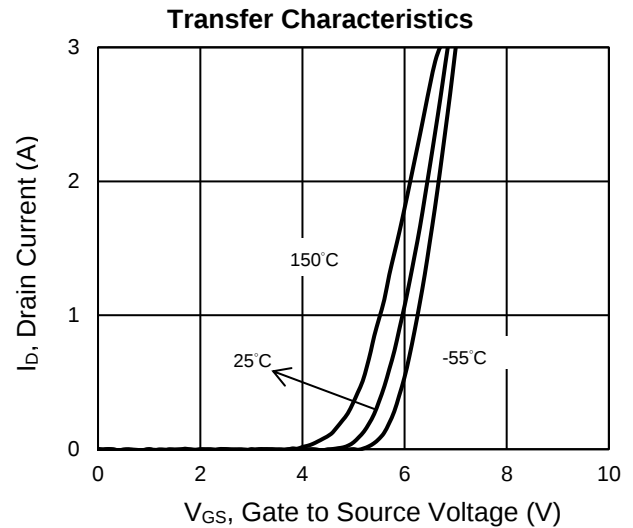
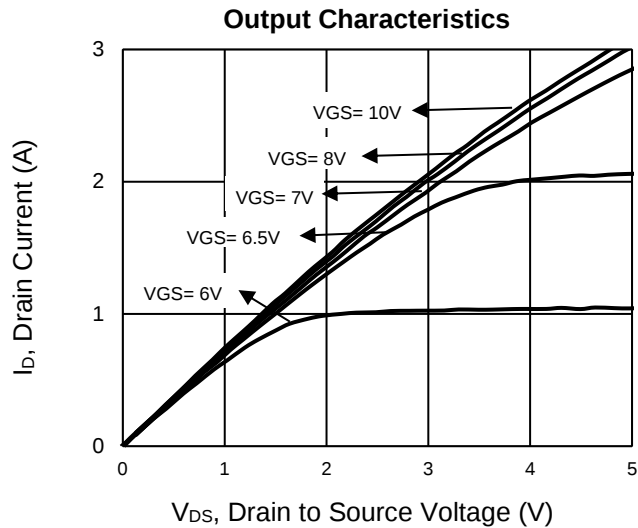
- Current limited by package.
- Pulse width limited by the maximum junction temperature.
- $L = 50mH, V_{DD} = 50V, R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$
- Pulse test: $PW \leq 300\mu s$, duty cycle $\leq 2\%$.
- For DESIGN AID ONLY, not subject to production testing.
- Switching time is essentially independent of operating temperature.

ORDERING INFORMATION

ORDERING CODE	PACKAGE	PACKING
TSM60NC1R5CH C5G	TO-251 (IPAK)	75pcs / Tube

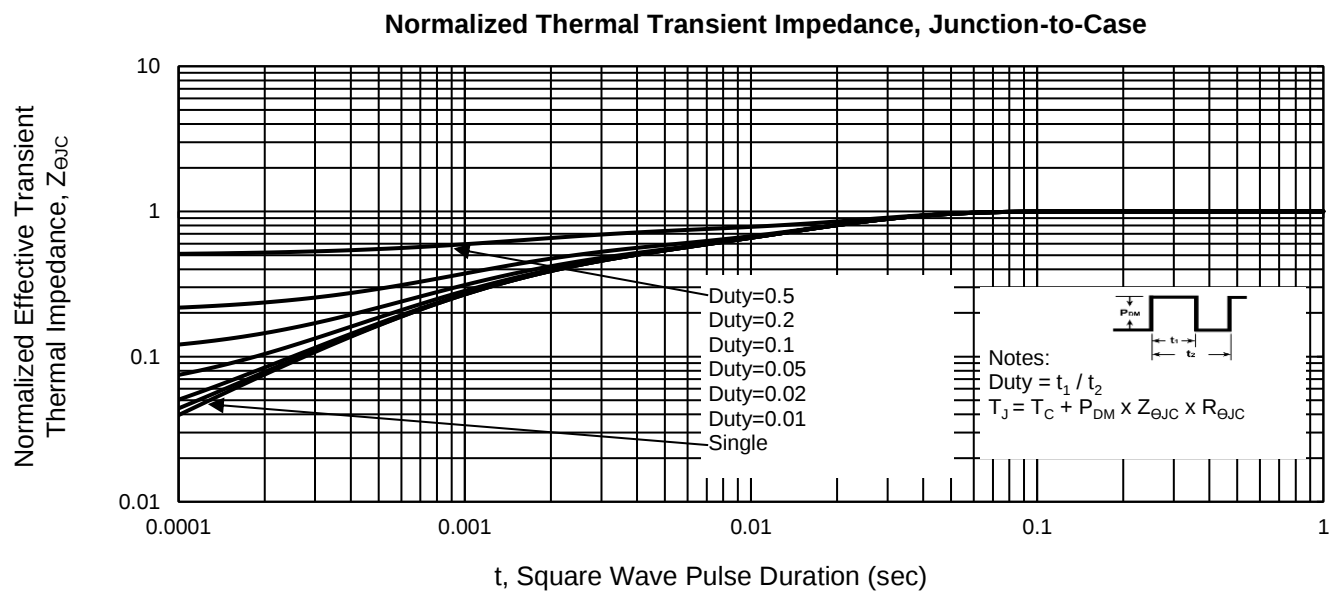
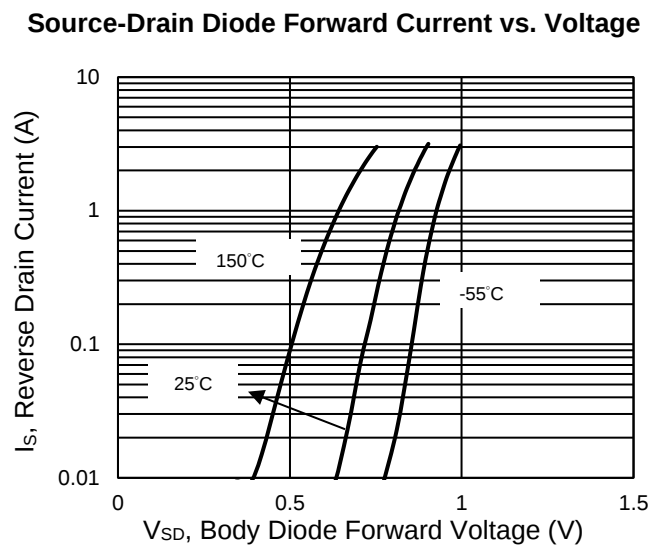
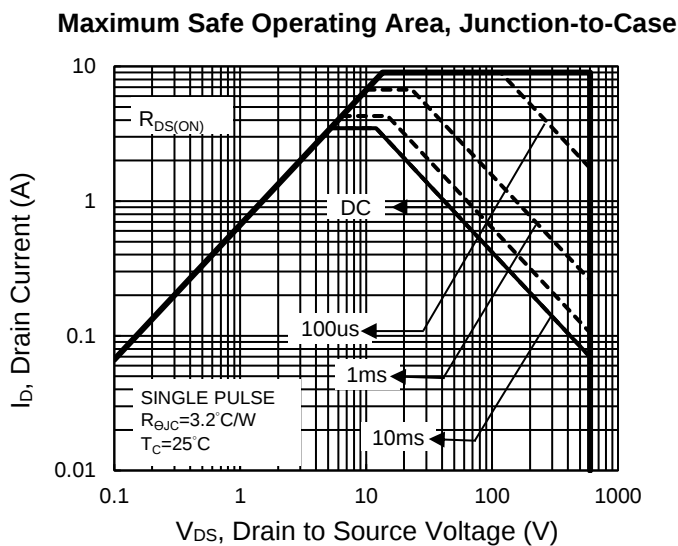
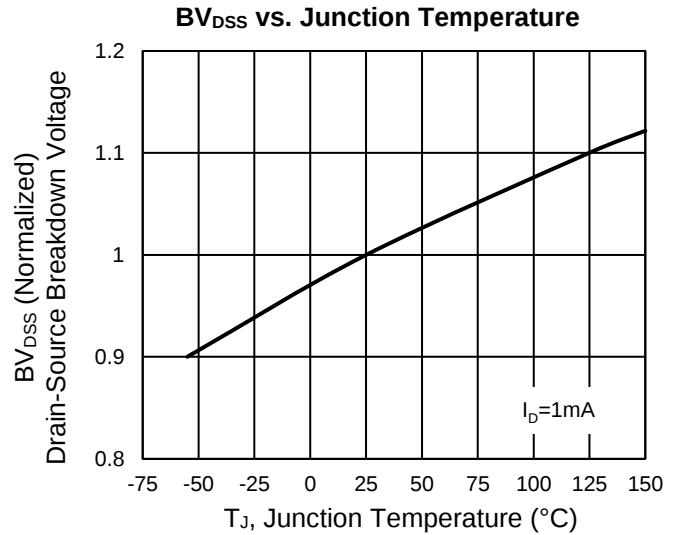
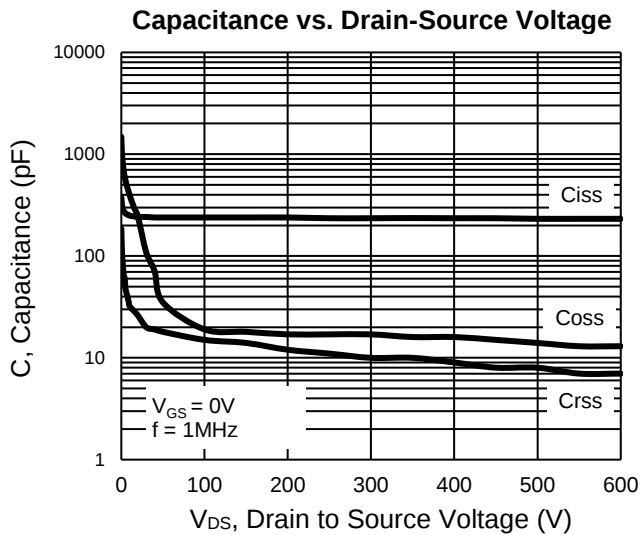
CHARACTERISTICS CURVES

($T_c = 25^\circ\text{C}$ unless otherwise noted)



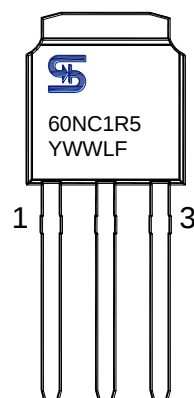
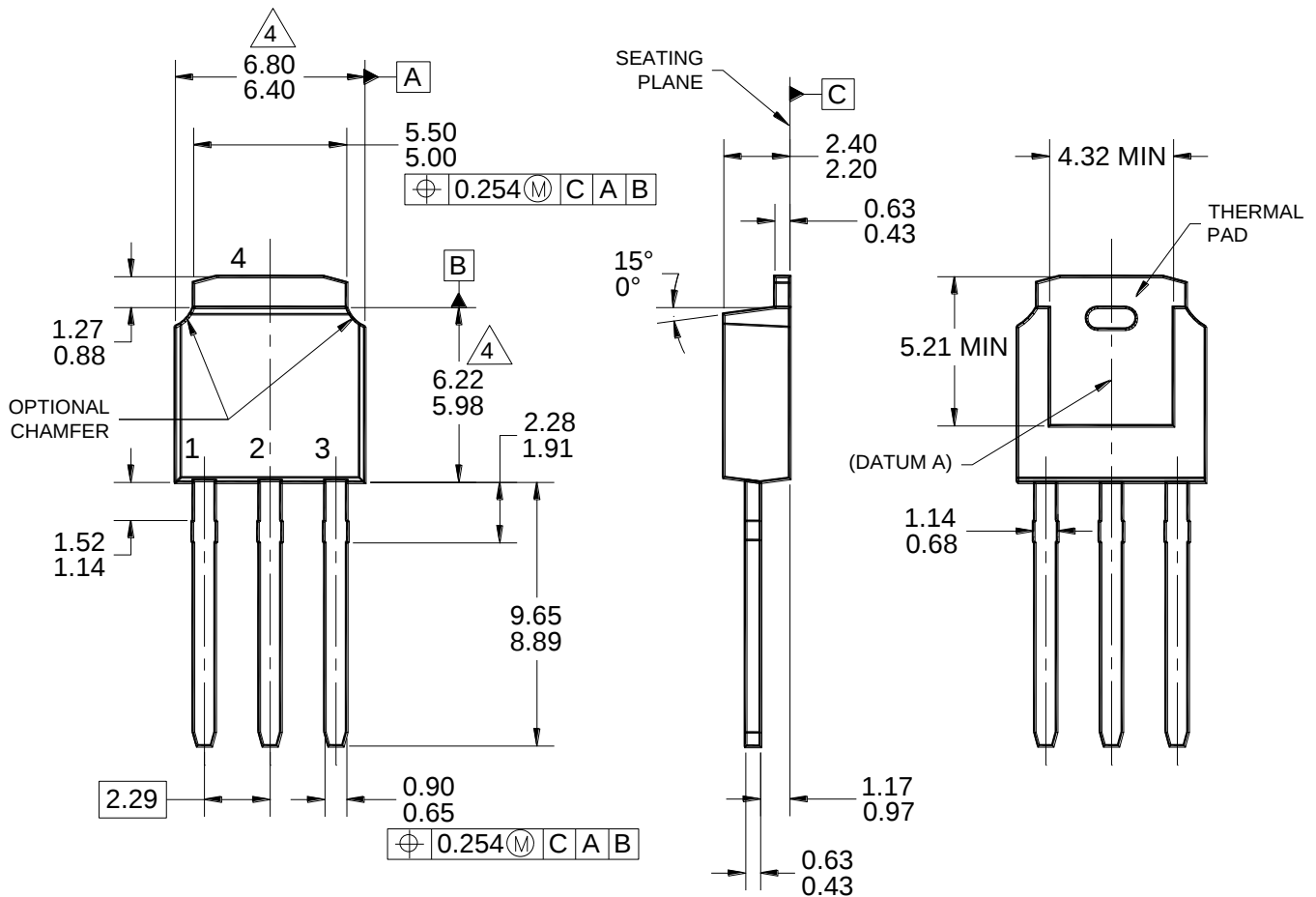
CHARACTERISTICS CURVES

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PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

TO-251 (IPAK)



MARKING DIAGRAM

60NC1R5 = Device marking
Y = Year Code
WW = Week Code (01~52)
L = Lot Code (1~9,A~Z)
F = Factory Code

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
3. THIS CONFORM TO JEDEC PACKAGE REGISTRATION TO-251, VARIATION AA.
4. MOLDED PLASTIC BODY DIMENSIONS DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.
5. DWG NO REF: HQ2SD07-IPAK-005 REV A.

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